JMB – EXAMPLE OUTPUT FROM EPA'S VISITT DATABASE. OVER 100 SYSTEMS ARE COVERED IN EQUAL DETAIL. MARK KLEINER ALSO HAS VISITT AT HIS COMPUTER. — RHG

UNITED STATES ENVIROMENTAL PROTECTION AGENCY
VENDOR INFORMATION SYSTEM FOR INNOVATIVE TREATMENT TECHNOLOGIES (VISITT)

Part 1: General Information and Technology Overview

Date submitted: 09/20/91

Developer/Vendor name: ROY F. WESTON, INC.

Street address: 1 Weston Way

City: West Chester State: PA Zip: 19380

Country: USA

Contact name: Michael G. Cosmos, P.E.
and title...: Technical Director

Contact phone: (215) 430-7423 Fax Number: (215) 430-3126

Telex number: ( ) -

Standard technology type:
THERMAL DESORPTION - OFF-GAS TREATED

Technology name assigned by vendor (e.g., trade name):

Low Temperature Thermal Treatment (LT3)

Technology is being or has been tested in EPA SITE Program ? Yes

Literature on technology available on request ? Yes

Part 1: General Information and Technology Overview (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

General description of technology:

The LT3 technology is a low temperature thermal desorption system designed to remove volatile and semivolatile organic compounds from a variety of solids including soil, sludges and sediments.

The LT3 system is available on a full-scale basis. The LT3 is a continuous operation that utilizes a hollow flight screw conveyor to indirectly heat the soil to approximately 500 degrees F. A high temperature fluid such as steam or heat transfer fluid is circulated through the hollow flights of the thermal processor. As the soil is conveyed through the processor it is indirectly heated. The temperature of the soil increases driving off moisture and volatile and semivolatile organic compounds. A continuous stream of nonoxidizing gases are drawn through the processor to remove the volatilized organics and moisture. The vent gases are directed to the pollution control equipment prior to discharge into the atmosphere. The pollution control equipment includes a baghouse dust collector, two condensers and a carbon adsorption system. The water and organic liquid recovered in the two condensers is processed through a separator for collection of the organic phases.

Part 1: General Information and Technology Overview (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Technology highlights:

The advantages of the LT3 process include:

- The cost of operation of the LT3 is much smaller when compared to incineration or comparable thermal technologies.
- The size of the process equipment, because of indirect heating, is much smaller than similar capacity incineration systems.
- The organic phases recovered in the condensers can be utilized for product recovery.
- The gas volume emitted from the processor is an order of magnitude lower than comparable direct fired technologies.
- The low operating temperature minimizes the volatilization of volatile hazardous heavy metals.

Part 1: General Information and Technology Overview (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Technology status:

_ Bench scale or emerging. Technology shown to be feasible through the use of bench-top equipment in the laboratory. Available data cannot be used to scale up to full scale in the absence of additional pilot-scale or full-scale experience for similar applications.

_ Pilot scale. Available equipment is of sufficient size to verify technology feasibility or establish the design and operating conditions for a full-scale system. However, it is not of the size typically used for a cleanup.

X Full scale. Available equipment is sized and commercially available for actual site remediation.

Potential or actual waste/media treated:

X Soil

X Sludge

X Solid

X Natural sediment

_ Ground water in situ

Part 1: General Information and Technology Overview (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Potential or actual contaminants and contaminant groups treated by this technology:

	Organic		Inorganic
X	Halogenated volatiles	_	Heavy metals
X	Halogenated semivolatiles	_	Nonmetallic toxic elements
X	Nonhalogenated volatiles	_	Radioactive metals
X	Nonhalogenated semivolatiles	_	Asbestos
X	Organic pesticides/herbicides	_	Inorganic cyanides
_	Dioxins/furans	_	Inorganic corrosives
_	PCBs		
X	Polynuclear aromatics (PNAs)		Miscellaneous
X	Solvents	_	Explosives/propellents
X	Benzene-toluene-ethylbenzene-xylene (BTEX)	_	Organometallic pesticides/ herbicides
_	Organic cyanide		
_	Organic corrosives		

Others:

Part 1: General Information and Technology Overview (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

General sources or types of industrial waste or contaminated sites that the technology can address:

X	Agriculture	X	Paint/ink formulation
_	Battery recycling/disposal	_	Pesticide manufacturing/use
_	Chloro-alkali manufacturing	X	Petroleum refining and reuse
X	Coal gasification	X	Photographic products
X	Dry cleaners	X	Plastics manufacturing
X	Electroplating	X	Pulp and paper industry
_	Herbicide manufacturing/use	X	Other organic chemical manufacturing
_	Industrial landfills	_	Other inorganic chemical manufacturing
X	Inorganic/organic pigments	X	Semiconductor manufacturing
_	Machine shops	_	Rubber manufacturing
_	Metal ore mining and smelting	_	Wood preserving
_	Municipal Landfill	_	Uranium mining
X	Munitions Manufacturing		

Others:

Part 1: General Information and Technology Overview (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Technology limitations:

The LT3 technology is not applicable for treating waste contaminated only with heavy metals. The process is also not applicable to free liquids or fluids. There is no limit on the quantity of moisture in the waste provided the material can be handled by the screw and other material conveyors as a solid.

Technology status comments:

The LT3 technology is available on a full-scale basis and has been proven on a variety of organic contaminants. Bench-scale tests are being routinely conducted for clients to determine applicability to particular waste characteristics.

PART 2: Pilot- and Full-scale Technologies:
Detailed Information and Performance Data

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Vendor services:

_ Equipment manufacture

X Subcontractor for cleanup services

X Prime contractor for full-service remediation

Pilot-scale Equipment/Capabilities

Major unit processes:

The primary component of the bench-scale LT3 equipment is the thermal processor, an indirect heat exchanger. The thermal processor is used to heat and consequently dry contaminated soils and sludges. The net effect of heating the soil is to evaporate organic components from the soil.

The processor consists of a trough which houses a double screw mechanism. The screws are 3 inches in diameter, 30 inches in length, and provide 4.7 square feet of heat transfer surface area. A variable speed drive controls the rotational speed of the screws. The range of rotational speeds is from 1 to 20 rpm.

The thermal processor is electrically heated. The unit is designed to simulate the use of hot oil for heating (as in a full-scale application). The intermeshing fin-slight screws are electrically heated with cartridge-type heaters which run the entire length of the shaft. The maximum heat input to the screws is 4 kilowatts.

Two Chromalox strip heaters are attached to the sides of the trough to provide additional heat capacity. One strip heater is provided on each side of the trough. The strip heaters are 1.5 inches wide with an overall length of 26.75 inches. Each strip heater is rated at 1,000 watts at 120 volts and provides 12 watts per square inch.

The area above the twin screws is provided with a dome cover and stack. A sweep gas (nitrogen) flows through the unit to provide an inert atmosphere and prevent potential problems with the lower explosive limits (LELs) of contaminants. The bench-scale tests are conducted in a laboratory hood which provides a negative draft. Hood discharge gases are treated via carbon adsorption and high efficiency filtration.

PART 2: Pilot- and Full-scale Technologies:
Detailed Information and Performance Data (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Number of pilot-scale systems:

____ Planned/in design

____ Under construction

1 Constructed

Pilot-scale facility is:

_ Transportable

X Fixed

_ In situ

Location of fixed facility:

City: Lionville State: PA

Pilot capacity range per hour. Capacity of batch processes is prorated.

5.00 to 25.00 Pounds

Can you conduct pilot-scale treatability studies on some type of waste at your location? Yes

At a contaminated site? Yes

Quantity of waste needed for pilot-scale treatability study:

5 to 10 Gallons

Number of pilot-scale studies conducted on wastes from different sources or sites. Does not include tests on surrogate wastes.

20

PART 2: Pilot- and Full-scale Technologies:
Detailed Information and Performance Data (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Full-scale Equipment/Capabilities

Major unit processes:

Stockpiled soil is transported to the system by a front-end loader. The front-end loader carries the soil over a weigh scale. The soil weight is recorded for each load transported to the shredder. Soil is deposited directly on a power shredding device. Classified soil with a top size of less than 2 inches passes through the shredder into the feed conveyor. The feed conveyor is an enclosed radial stacker belt conveyor that is 18 inches wide and 60 feet long. The conveyor discharges into the surge hopper located above the thermal processor. The soil will be fed into the LT system at regular intervals to maintain the surge hopper seal.

The thermal processor consists of two jacketed troughs assembled in a piggyback fashion (one above the other). Each houses four intermeshed screw conveyors. Soil is carried across the upper tier of the processor by the screws. When the soil reaches the discharge end of the upper tier, it drops to the second tier via gravity. The soil is moved in the opposite direction, across the second tier, and then exits the processor at the same end that it entered.

The shafts and flights of the screw conveyors and the trough jackets are hollow to allow circulation of a heat transfer fluid (i.e. hot oil). The function of each screw conveyor is to move soil forward through the processor and to thoroughly mix the material, providing indirect contact between the heat transfer fluid and the soil.

Vapors are driven off the soil and are drawn out of the thermal processor by an induced draft (ID) fan. The draft created by the ID fan is maintained in the processor to allow the vapors to be removed from the processor.

Soil is discharged from the thermal processor into a horizontal screw conveyor. The horizontal screw conveyor discharges to a second screw conveyor, or ash conditioner. The conditioner is a ribbon flight screw conveyor. Water spray nozzles are installed in the conditioner housing to cool the discharge material and to minimize fugitive dust emissions. The conditioner discharges onto an inclined stacker belt. The stacker belt conveys the wetted processed soil from the conditioner to the dump truck.

PART 2: Pilot- and Full-scale Technologies:
Detailed Information and Performance Data (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Full-scale facility is:

X Transportable _ Fixed _ In situ

Full capacity range per hour:

5.00 to 10.00 Tons/hour

Logistical requirements for transportable or in situ technologies:

Space (area)....: 10000 ft2

Water .....: 7200 gals. per day

Electrical power: 600 amps

480 volts

Natural gas.....: 180000 ft3 per day

Sewage access...: _ yes X no

"Ballpark" estimate of price range per unit of waste treated:

100.00 to 150.00 per Ton

Price estimates shown above do not always include all indirect costs associated with treatment, such as: excavation, permits and treatment of residuals. For price comparisons, users should make certain that vendors provide estimates based on comparable remediation activities.

PART 2: Pilot- and Full-scale Technologies:
Detailed Information and Performance Data (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Factors that have significant effect on unit price (1 is highest):

__	Initial contaminant concentration	__	Excavation
__	Target contaminant concentration	__	Waste handling
__	Waste quantity	__	Permitting
__	Depth of contamination	__	Pretreatment
__	Depth to ground water	__	Amount of debris
4	Residual quantity	3	Utility/fuel rates
__	Residual waste characteristics	2	Labor rates
__	Site preparation		

Others:

1 - moisture content

PART 2: Pilot- and Full-scale Technologies:
Detailed Information and Performance Data (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Number of full-scale cleanups initiated or completed by this firm using this technology:

4

For equipment manufacturers - estimated or actual number of full-scal cleanups by other firms using this equipment:

Major permits obtained for a full-scale system, and issuing authority (e.g., RCRA, TSCA, NPDES, and Clean Air Act).

Permit Type.....: Air Permit
Issuing Authority.: IL\EPA

Permit Type.....: RCRA RD&D
Issuing Authority.: Region VI

Permit Type.....: Stanislaus Cty Air Permit
Issuing Authority.: CA\Stanislaus County

Permit Type.....: Air Permit
Issuing Authority.: MI\Michigan DNR (Pending)

Number of full-scale systems:

1 Planned/in design

Under construction

3 Constructed

PART 2: Pilot- and Full-scale Technologies:
Detailed Information and Performance Data (continued)

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Treatability Study Capabilities (Bench Scale)

Can you conduct bench-scale treatability studies on some types of waste at your location: X yes _ no

Number of bench-scale studies conducted to date.
Does not include tests on surrogate wastes:

20

Description of bench-scale testing procedures:

A bench-scale test is performed on a representative sample of waste material. The material, after receipt in the laboratory, is manually screened to remove all debris greater than 1/2". The feed material is sampled for moisture, density and appropriate organic constituents. The material is then fed into the bench-scale processor. After reaching steady state conditions a sample of material is collected from the discharge and temperature and residence time recorded. The retention time of the bench-scale processor is approximately 15 minutes. The processed material is collected and immediately recycled into the unit for a second and third pass, representing 30 and 45 minutes retention time. This data provides comparable results to the full-scale processor.

SUMMARY OF PERFORMANCE DATA

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Contaminant, contaminant group, or pollutant parameter:

BTEX

Untreated concentration range Mg/kg	Treated concentration range Mg/kg	Equipment Scale
160.000 to 160.000	0.015 to 0.015	Full scale

Waste description:

Contaminated soil

Soil classification:

Clay

Comments:

#2 fuel oil and gasoline spill

SUMMARY OF PERFORMANCE DATA

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Contaminant, contaminant group, or pollutant parameter:

VOCS and SVOCS

Untreated concentration range Mg/kg	Treated concentration range Mg/kg	Equipment Scale
0.000 to 111.000	0.000 to 0.100	Full scale

Waste description:

Contaminated soil

Soil classification:

Clay

Comments:

Treated residual analyzed using TCLP procedures

SUMMARY OF PERFORMANCE DATA

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Contaminant, contaminant group, or pollutant parameter:

Chlorinated solvents

Untreated concentration range Mg/kg	Treated concentration range Mg/kg	Equipment Scale
1400.000 to 27200.000	1.400 to 1.800	Pilot scale

Waste description:

Contaminated soil

Soil classification:

Clay

Comments:

Solvents included TCE and TCA

SUMMARY OF PERFORMANCE DATA

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Contaminant, contaminant group, or pollutant parameter:

PNA

Untreated concentration range Mg/kg	Treated concentration range Mg/kg	Equipment Scale
10.000 to 580.000	0.600 to 14.000	Bench scale

Waste description:

Coal tar materials

Soil classification:

Comments:

Material was especially sticky and tar like

SUMMARY OF PERFORMANCE DATA

Vendor name....: ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Contaminant, contaminant group, or pollutant parameter:

PNA and BTEX

Untreated concentration range Mg/kg	Treated concentration range Mg/kg	Equipment Scale
6.000 to 760.000	0.120 to 4.600	Bench scale

Waste description:

API separator sludge

Soil classification:

Comments:

Achieved all organic BDAT criteria

REPRESENTATIVE CLEANUP PROJECTS

Vendor name : ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Site name : Anderson Development Co. *

City : Adrian State: MI

Country : USA

Project type : SUPERFUND/PRIVATE LEAD

Client contact : Jim Huerta

Affiliation : Anderson Development Company

Phone number : (517) 263-2121

Equipment Scale:

_ Bench scale

_ Pilot scale

X Full scale

Project status (Month/Year):

Contracted : 08/91

Underway : X

Completed/To be completed : _____

Waste description:

MBOCA contaminated sludge and clay - 2,000 cubic yards

REPRESENTATIVE CLEANUP PROJECTS

Vendor name : ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Site name : Crows Landing, Naval Air Station

City : Crows Landing State: CA

Country : USA

Project type : DOD LEAD

Client contact : Tom Torres

Affiliation : Naval Civil Eng. Lab

Phone number : (805) 982-1658

Equipment Scale:

_ Bench scale

_ Pilot scale

X Full scale

Project status (Month/Year):

Contracted : 08/90

Underway : _____

Completed/To be completed : 05/91

Waste description:

Petroleum contaminated soil, 1,800 cubic yards

REPRESENTATIVE CLEANUP PROJECTS

Vendor name : ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Site name : Tinker Air Force Base (Soldier Creek)

City : Oklahoma City State: OK

Country : USA

Project type : DOD LEAD

Client contact : Wayne Sisk

Affiliation : USATHAMA

Phone number : (301) 671-2466

Equipment Scale:

_ Bench scale

_ Pilot scale

X Full scale

Project status (Month/Year):

Contracted : 08/89

Underway : _____

Completed/To be completed : 12/90

Waste description:

JP4 and chlorinated solvents, 2,000 cubic yards

REPRESENTATIVE CLEANUP PROJECTS

Vendor name : ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Site name : Letterkenny Army Depot

City : Letterkenny State: PA

Country : USA

Project type : DOD LEAD

Client contact : Wayne Sisk

Affiliation : USATHAMA

Phone number : (301) 671-2466

Equipment Scale:

_ Bench scale

X Pilot scale

_ Full scale

Project status (Month/Year):

Contracted : _____

Underway : _____

Completed/To be completed : 06/86

Waste description:

Solvent contaminated soil

AVAILABLE REFERENCES

Vendor name : ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Reference: Cosmos, M., Nielson, R., "Low Temperature Thermal Treatment (LT3) of Volatile Organic Compounds from Soil," Environmental Progress, Pgs. 139-142

Source:

Name/Organization: Mike Cosmos/Roy F. Weston, Inc.

Address: 1 Weston Way

City : West Chester

State : PA

Zip : 19380

Phone number: (215) 430-7423

AVAILABLE REFERENCES

Vendor name : ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Reference: U.S. Patent and Trademark Office, Number 4,738,206, April 1988

Source:

Name/Organization: U.S. Patent and Trademark Office

Address: Commissioner of Patents & Trademark

City : Washington

State : DC

Zip : 20231

Phone number: (703) 308-0101

AVAILABLE REFERENCES

Vendor name : ROY F. WESTON, INC.

Technology type: THERMAL DESORPTION - OFF-GAS TREATED

Reference: Velazquez, L., Noland, J., "Low Temperature Thermal Stripping of Volatile Compounds," Environmental & Public Health, Conference J

Source:

Name/Organization: Luis Velazquez/Roy F. Weston, Inc.

Address: 1 Weston Way

City : West Chester

State : PA

Zip : 19380

Phone number: (215) 430-7428